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ABSTRACT

Attitudes and attitude measurement are critical components of teaching and learning and the instructional developer should collect as much relevant data about that process as possible. It is important for instructional developers to study the attitudes of learners in order to demonstrate attitude/achievement relationships, promote attitudinal position, reduce attitudinal influence, and to assess the impact of specific instruction. Attitude measurement should be valid, reliable, replicable, and fairly simple to administer, explain, and understand. Categories for collecting attitude information include self-reports, reports of others, sociometric procedures, and records. To insure effective attitude measurement, one must identify the construct to be measured and find an instrument that will measure the relevant construct. If no existing measure is available, the instructional developer will need to construct his/her own test, recognizing the critical importance of reliability and validity of information. A pilot study should be conducted in order to revise tests for actual use. When testing is completed, resulting data must be summarized, analyzed, and displayed for the consumer. A bibliography and examples of the measurement process are included. (CWM)

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TITLE: Measuring Attitudes and Instructional Development: Why and How

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Media specialists and instructional developers generally ask three questions when the measurement of attitudes is promoted as a component of the instructional design process.

- Why are attitudes important in the teaching/learning process?
- Why is it important to measure attitudes?
- How are attitudes measured?

This paper will attempt to answer these questions.

Part I. Importance of Attitudes and Attitude Measurement

When the instructional developer designs a classroom activity there should be at least two categories of learning outcomes in mind--those directed toward cognitive goals, and those related to the attitudes of the learner. There is little need to discuss the rationale for the importance of information acquisition by a learner as a result of instruction. The need for establishing attitudinal goals and for planning activities designed to produce affective outcomes in learners as a consequence of an instructional sequence is a little more difficult to explain to many. However, it has become increasingly apparent to many involved in educational technology research that one of the major, unique consequences of mediated instruction is not directed toward knowledge gain. Rather, instruction from television, film and slides often produces certain attitudinal positions in students not necessarily found when media are not used in teaching. In a recent review of educational technology research it was found that when attitude hypotheses were tested, over fifty percent of the time desired attitudinal positions or changes were produced (Simonson, 1977; 1979a; 1979b). In other words, in about

one half of the experiments reviewed, the attitude toward instructional method or content area possessed by students were either favorable, or changed in a desired direction, after instruction that was delivered primarily by media.

Still, the instructional developer may say, "So what, the purpose of instruction is to promote the acquisition of knowledge and skills, and it doesn't make any difference if students like or dislike what they learn, or how they are taught."

This persuasive and prevalent, if narrow, argument is somewhat difficult to refute. The most powerful rationale for the need to promote attitude positions in learners would be to demonstrate a direct relationship between attitudes and achievement, or liking and learning. And as a matter of fact, numerous researchers have identified just such a relationship (Simonson and Bullard, 1978; Simonson, 1977; Levy, 1973; Fenneman, 1973; Perry and Kopperman, 1973; and Greenwald, 1966, 1965, for example). However, most educational researchers are very reluctant to claim that there is any cause and effect linkage between these two learner variables.

Probably the development of a positive attitude in learners should be a desirable end in itself. There are several reasons why attitudes of learners should be important. First, most instructional developers would agree that there are cases when it is legitimate, and important, to urge learners to accept the truth of certain ideas. In other words, to promote an attitudinal position. Second, while the strength of the relationship between attitudes and achievement is unclear, it makes common sense that students are more likely to remember information, seek new ideas, and continue studying, when they react favorably to an instructional

activity, or "like" a certain content area. Third, there are some instances when influencing the attitudes of students is not desirable, so instructional developers should be aware of what techniques do affect attitudes. In this way possible bias can be recognized and eliminated. Last, attitudes toward instruction felt by learners can tell the developer a great deal about the impact of that instruction on the learning process. In other words, we need to assess the opinions of our students toward the learning activities we are subjecting them to, if for no other reason than to improve the quality of our procedures. Whatever the reason, attitudinal outcomes should be important considerations for the designer of instruction.

DEFINING ATTITUDES: Before attitudes can be measured, we must identify what this term means, and what contributes to additional positions in learners. Attitude has been a difficult concept to adequately define, primarily because it has been defined by so many, but also because of its many lay uses and connotations. One of the earliest definitions of attitude was proposed by Thomas and Znaniecki (1918). They defined attitude as:

> A mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related (Thomas and Znaniecki, 1918).

In other words, while attitudes are latent and not directly observable in themselves, they do act to organize, or to provide direction to, actions and behaviors that are observable. Also, attitudes vary in direction, either positive or negative; in degree, the amount of positiveness or negativeness; and in intensity, the amount of commitment with which a position is held (Fleming and Levie, 1978).

Additionally, attitudes have three components: affective, cognitive, and behavioral (Zimbardo and Ebbeson, 1970). The affective component is said to consist of a person's evaluation of, liking of, or emotional response to some object or person. The cognitive component is conceptualized as a person's beliefs about, or factual knowledge of, the object or person. The behavioral component involves the person's overt behavior directed toward the object or person.

Part II. How Attitudes are Measured

Since attitudes are defined as latent, and not observable in themselves, the instructional developer must identify some behavior that would seem to be representative of the attitude in question, so that this behavior might be measured. This characteristic of attitude measurement is justifiably the most criticized limitation of this area of educational evaluation. However, without going into the question of the over-all validity of attitude measurement, there are several generally recognized procedures used to determine an individual's or group's attitude toward some object or person. It is those procedures that are outlined below.

CHARACTERISTICS OF MEASUREMENT: Before procedures for measuring attitudes are discussed, there are several characteristics of measurement, in general, that should be considered in order to determine if an evaluation technique is an effective one. Basically, attitude measures should:

- be valid -- In other words, is the instrument appropriate for what needs to be measured?
- be reliable -- Does the measure yield consistent results?

- be fairly simple to administer, explain, and understand -- Generally, the measures that yield a single "score" of an attitude position epitomize the intent of this characteristic, although the single "score" may be deficient in meeting the intent of other characteristics of good measurement.
- be replicable -- In other words, someone else should be able to use a measure on a different population, or in a different situation, to measure the same attitude.

CATEGORIES OF ATTITUDE MEASUREMENT: Basically, there are four categories, or approaches, for collecting attitude information. These approaches are:

- self-reports, where the members of a group report directly about their own attitudes,
- reports of others, where others report about the attitudes of a person or group,
- sociometric procedures, where members of a group report about their attitudes toward one another, and
- records, which are systematic accounts of regular occurrences, such as attendance reports, sign-in sheets, library check-out records, and inventories.

Within each of these categories there are one, or more, strategies for measuring attitude-related behaviors. Most commonly, attitude measurement is accomplished by one of the following techniques.

- questionnaires
- rating scales
- interviews
- written reports
- observations
- sociometrics

PROCESS FOR ATTITUDE MEASUREMENT: Any attempt at measurement, including the evaluation of attitude, requires that a systematic process be followed. Such procedures will not guarantee an effective measurement, but they do increase the likelihood of this occurring, considerably. Generally, there are six steps to be followed during the attitude measurement process.

1. Identify Construct to be Measured - A learner could conceivably have an attitude position toward any object, situation, or person. When instruction is designed, those attitudes that are important to the learning activity should be clearly identified and defined. For example, if the developer of instruction wanted to ascertain the impact of a certain type of media on learners, the construct "attitude toward instruction by film" could have been an attitude outcome that was evaluated.

2. Find an Existing Measure of the Construct - Once a certain attitude has been identified, the designer should attempt to locate an instrument that will measure the relevant construct. Generally, such tests will have been tried out in other instructional situations and should include some statement of reliability and validity. Additionally, instructions for administration of the test selected should be included. This will simplify the job of using the instrument for the instructional developer.

The most obvious disadvantage to using a pre-prepared measure is that it may not be evaluating the specific attitude construct being studied. Even if this is the case, it may sometimes be possible to extract valuable information from an instrument designed to test an attitude position similar to the one of specific interest.

There are a large number of sources for finding existing attitude instruments. Buros' Mental Measurements Yearbook is probably the most

widely known. Of equal value is Buros' Tests in Print. Other reference sources for attitude tests include the CSE Test Evaluation Series, Robinson's Measures of Psychological Attitudes, Rosen's Attitudes Toward School and School Adjustment, and Knapp's Omnibus of Measures Related to School Based Attitudes (see reference list for citations).

3. Construct an Attitude Measure - Obviously, if no existing measure of the relevant attitude is available the instructional developer will need to construct his/her own test. This is probably the most difficult and time consuming step in the attitude measurement process. Often it is the most critical. The test developer should apply a large degree of patience and effort during these procedures.

Of the many types of attitude measurement possible (see above), one technique widely used that seems to possess most of the characteristics of a good measure is the "Agreement, or Likert-type, Scale." This technique uses statements about the attitude object that are either clearly favorable or unfavorable. Each subject responds to each test item according to his/her perceived attitude "intensity" toward the statement. Often, students are asked to answer each test item on a five point scale that has responses that vary in the degree of agreement to the statement from strongly disagree to strongly agree (see Figure 1). One advantage of this technique is the ease of scoring and summarizing the information obtained. (For a complete listing of the steps necessary to construct an agreement scale see Table 1; for a more complete description of how various types of attitude measures are designed see Henerson, 1978.)

When a test is constructed locally it is critical that reliability and validity information be collected for the measure. Of these two concepts, validity (ie. appropriateness of instrument) is the most difficult

to determine. Validity for a test depends on a number of factors, such as the type of test and its intended use. Basically, there are four categories of validity.

- Construct validity (or the extent to which you can be sure a measure represents the attitude construct whose name appears in its title) can be determined by:
    1. opinions of judges,
    2. correlations to other measures of the same construct,
    3. measures of criterion group subjects (those who obviously possess the construct), or
    4. appeals to logic.
- Content validity (or the representativeness of the sample of questions included in the instrument) is usually determined by careful analysis of the items in the test. There is no simple process to determine content validity other than a close, thoughtful examination of each item separately, and all items together.
- Concurrent validity (or the agreement of a test with a parallel form of the test on the same topic that was administered at approximately the same time) is determined by correlating the results of two parallel measures of the attitude. This correlation coefficient is reported as an index of concurrent validity.
- Predictive validity (or how well a measure will predict some future behavior) is determined by comparing results of an attitude test to some measure of behavior given at some point in the future. Again, this type of validity is usually expressed by a correlation coefficient found by comparing results of the two measures.

Obviously, determining validity is not a simple task. However, every instructional developer who constructs a test of any type should be acutely aware of the need to develop valid instruments. Since there is no single established method for determining validity, the test originator should use care in constructing, administering and interpreting tests, and their results. Finally, these precautions should be described to, and for, the consumer of the test data.

Reliability, or the ability of a measure to produce consistent results, is usually less difficult to determine than validity. There are several methods of determining reliability that can be easily used by the attitude test developer. The "Test-Retest" method involves the re-administration of the instrument to the target group and correlating the results. The "Split-Half" method uses an arbritrary division of the instrument into two halves. Results from each half are correlated and reported as a reliability coefficient. "Alternate-Form" reliability involves the correlation of the results of two parallel forms of tests of the same attitude construct. Each subject takes each form and the resulting correlation is reported as a reliability estimate.

Each of these techniques will yield a score from 0.00 to 1.00. The higher the number, the more reliable the test. Generally speaking, reliability coefficients above .70 are considered respectable. Scores above .90 are not uncommon for standardized attitude tests. As with validity, the results of reliability estimation should be reported to the consumer of your testing activities. (For more information on validity and reliability estimation see Anastasi, 1968; Cronbach, 1970; Fitz-Gibbon, 1978; Henerson, 1978; or Talmage, 1976).

4. Conduct a Pilot Study - While it is possible to obtain validity and

reliability data during the actual testing portion of the instructional activity, it is much more logical to at least try out attitude instruments before they are formally used. This should be done in order to obtain appropriate data, but also to uncover minor, but troublesome, administrative problems, such as misspellings, poor wording, or confusing directions.

5. Revise Tests for Actual Use - Results of pilot testing should be used to revise, or "polish," attitude instruments. Once the "bugs" have been eliminated the measure is ready to be used with its intended target audience.

6. Summarize, Analyze, and Display Results - When testing is completed resulting data must be interpreted. Generally, attitude test results should be handled similarly to any other test information. Obviously, numerical data is easier to manipulate than verbal information. Whatever attitude responses have been collected, it is important to summarize, analyze and display the results in such a manner that they are easily and quickly understood by others. For example, raw data should be collected and recorded on some type of summary sheet. A "quick-tally" sheet is often used when data is to be hand scored (see Figure 2). When data is to be machine scored it should be recorded on the familiar 80 column coding sheet. This sheet corresponds to the standard 80 column computer card. An even simpler technique for coding data is to have students respond to attitude test items on a "mark-sense" (optical scoring) sheet. When this type of scoring sheet is used, the raw data can be easily accessed for computerized statistical analysis without the need for intermediate coding steps (see Henerson, 1978).

After data has been collected and coded it should be analyzed. Most researchers consider "Agreement Scale" data to be "Ordinal-Scale" (Ferguson, 1971), so it can by analyzed using standard tests of description

and inference. However, data about instructional mode or content area is often useful if it is merely averaged and compared to other averages. In other words, did the class change in average "Attitude Toward India" after viewing the film? Did they react favorably to "Film as a Method of Instruction as Compared to Lecture?" Often merely "eyeballing" average scores or "change scores" will be helpful in analyzing data and in interpreting the impact of mediated instruction on attitudes.

Displaying data is another effective method of analyzing it for the consumer. Charts, graphs, & bar diagrams are examples of data display techniques that are useful in assisting in the understanding of what test results indicate. Whatever the process, the developer of an attitude test should make every effort to decipher the results of the measure, and to explain those conclusions and implications to the consumer of the data. Sometimes this may mean that the developer will have to apply a considerable amount of subjective interpretation to data. This is not necessarily bad. Naturally, the more that opinions can be based on, or replaced by, facts, the more powerful conclusions will be. (See Figure 3 for examples of data display techniques.)

Conclusion

Obviously, attitude measurement is only one of many evaluation techniques for the instructional developer to consider for use. However, since attitudes are "predispositions to respond" they would seem to be related, in some manner and degree, to what happens to, and in, a learner during the instructional process. Admittedly, there are many possible deficiencies in the measurement techniques described. Attitude measurement is certainly not as refined as anyone would like. That does not mean that understanding

the impact this construct has on the learning process is not important. In order to facilitate a more complete understanding of teaching and learning the instructional developer should collect as much relevant data about that process as is possible. Attitudes and attitude measurement are a critical component of that understanding.

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FIGURE 1 - AGREEMENT SCALE

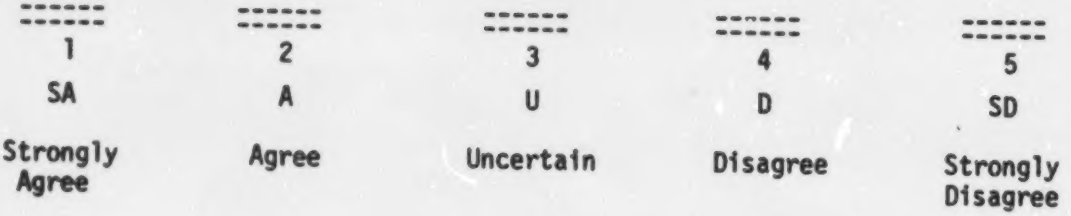

FIGURE 2 - "QUICK-TALLY" SHEET

ITEM #	YES	NO	?
1	𝍸 ///	///	/
2	//	𝍸 /	////

FIGURE 3: DISPLAYING GROUP DATA

Example. Of the 50 children interviewed, 19 boys and 13 girls reported having taken part in the after school recreation program. These 32 children reported having engaged in the following activities:

	boys	girls	total
handball	19	7	26
bars and rings	16	12	28
team games (baseball, kickball)	17	10	27
handicrafts	12	12	24
chess	8	8	16
checkers	10	8	18

Example. On the following scale, responses were distributed as indicated by the numbers below the scale.

	strongly disagree	dis-agree	un-certain	agree	strongly agree
	1	2	3	4	5
Scale	1	2	3	4	5
Number of respondents	20	6	2	2	24

Were you to calculate the average response, you would obtain 3.07, close to "uncertain." Since 20 people checked "strongly disagree" and 24 checked "strongly agree," it would certainly be misleading to report only that the average response was 3.07, "uncertain"! The *bimodal* character of the responses would have to be reported.

Example. Of the 500 questionnaires mailed to the parents, 225 were returned. The following presents the numbers and percentages of responses item by item:

		Yes	Uncertain	No
1.	Have you been given an explanation of why most classes at school consist of more than one grade level?	137 (61%)	26 (12%)	62 (27%)
2.	Are you in favor of classroom groupings that consist of children of more than one grade level?	170 (75%)	15 (7%)	40 (18%)
3.	Are you in favor of having parent volunteers in your child's classroom?	220 (98%)	3 (1%)	2 (1%)

If you have used a questionnaire, you might wish to display the results *on the questionnaire itself.* Given sufficient space on a blank questionnaire, you could record the number of percentage of each response option:

	Yes	No
Did you attend the open house?	☐ 200 (67%)	☐ 100 (33%)
Did you attend the back-to-school night?	☐ 151 (50%)	☐ 149 (50%)

FIGURE 4: DISPLAYING ITEM-BY-ITEM RESULTS

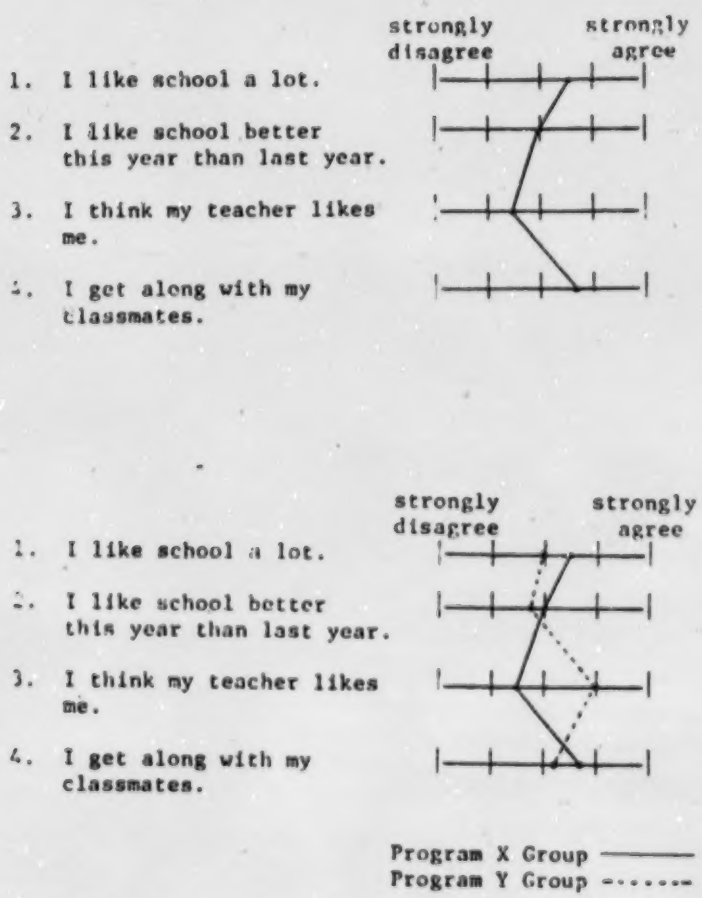
strongly disagree
strongly agree
1. I like school a lot.
2. I like school better this year than last year.
3. I think my teacher likes me.
4. I get along with my classmates.
strongly disagree
strongly agree
1. I like school a lot.
2. I like school better this year than last year.
3. I think my teacher likes me.
4. I get along with my classmates.
Program X Group
Program Y Group

TABLE 1: STEPS FOR DEVELOPING AN AGREEMENT SCALE (Henerson, 1978)

The Agreement Scale

The more common agreement scale also consists of a series of attitude statements. Unlike the ordered scale, however, these sentences do not represent gradations of the attitude. They embody extreme statements, either clearly favorable or clearly unfavorable. The agreement scale achieves a wide range of scores by having respondents report the *intensity* of an attitude. This is accomplished by providing gradations within the response alternatives. The respondents are asked to indicate their agreement with each statement on a 5-point scale:

SA	A	U	D	SD
strongly agree	agree	undecided	disagree	strongly disagree

This question format is a familiar one that can be found in a variety of measures, not just attitude rating scales. It is a popular multiple-choice format that is frequently used in the construction of many types of attitude questionnaires.

Steps for Constructing and Using an Agreement Scale

1. Accumulate a large number of clearly favorable or clearly unfavorable statements about the attitude you wish to measure (approximately 60). As with the statements for the ordered scale, a good source might be prospective respondents.
2. Ask a *pilot* group (50 or more) to respond to these statements. The pilot group should consist of people who are (a) similar to the people whose attitudes you wish to measure, and (b) likely to express the whole range of attitudes you wish the instrument to detect.
3. Score responses by assigning them from one to five points: five for most favorable, one for least favorable. This, of course, means responses will be scored differently depending on whether the statement reflects a negative or positive attitude.

Example. Scoring key for two items measuring attitude toward school

School is a waste of time.					School teaches you things that help in getting a job.				
SA	A	U	D	SD	SA	A	U	D	SD
1	2	3	4	5	5	4	3	2	1

Note that the highest rating (5) for favorable attitude toward school may be given to strongly disagree (SD) or to strongly agree (SA) depending on how the item is worded.

4. Compute a score for each respondent by totaling the points corresponding to his or her responses.
5. Identify high scorers (top 25%) and low scorers (lowest 25%).
6. Analyze each statement according to how high and low scorers responded to it. The method for accomplishing this step, called "item analysis," is discussed below.
7. Retain those items (approximately 20) which provided good discrimination between high and low scorers.
8. Construct the questionnaire by listing the retained statements in random order.
9. Administer the instrument.
10. Compute a score for each respondent by totaling the scores corresponding to his or her responses.

TABLE 2: STEPS FOR DEVELOPING AN ORDERED SCALE (Henerson, 1978)

The Ordered Scale

The ordered scale consists of a collection of statements that express a range of opinions about an attitude object:

- School teaches you things that help in getting a job.
- Most teachers deeply care about their students.
- Sometimes school can be interesting.
- School is really a bore.
- There are too many rules at school.
- School is the most valuable way I can spend my time.

Before inclusion on the measure, these statements are assigned a "scale value" along an attitude continuum by a panel of judges. An instrument is then constructed which presents the statements in random order without indicating their scale values. The respondents are asked to check those statements with which they agree. Only *opinion statements* are used. *Factual statements* are not included in this kind of measure, since people with differing attitudes could agree to a statement of fact. Note that the respondents are asked to select only those items *with which they agree* and to reject all others.

Steps For Constructing and Using an Ordered Scale

1. Accumulate a large number of statements about the attitude object (approximately 100). A good source for these statements might be interviews of prospective respondents. Make sure that the statements represent a wide range of opinion, including moderate ones.
2. Place each statement on a separate piece of paper.
3. Select a group of judges (preferably 30 or more people like the prospective respondents) and ask each one to sort the statements into 11 piles ranging from highly unfavorable (1) through neutral (6) to highly favorable (11). *Make sure the judges understand that they are classifying the statements and not indicating their agreement or disagreement with them.*
4. Throw out statements that have been placed in widely differing piles. These are ambiguous statements.
5. For each remaining statement, arrive at a scale value by computing the median or mean position of the assignments by the judges.
6. Select a set of statements (under 25) whose scale values will give you a spread that evenly covers the continuum from highly unfavorable to highly favorable.
7. Construct the questionnaire by listing the statements in *random order*. Do not indicate scale values on the instrument.
8. Administer the instrument, instructing respondents to indicate with which statements they agree.
9. Compute a score for each respondent by finding the mean of the scale values of the statements selected by that respondent.

TABLE 3: STEPS FOR DEVELOPING A SEMANTIC DIFFERENTIAL (Henerson, 1978)

Steps for Constructing and Using a Semantic Differential

1. Determine the attitude object(s) you wish to investigate.
2. Select appropriate adjective pairs (approximately 10). You may wish to select from the list provided at the end of this chapter or from DiVesta's list if it suits your students. You may, on the other hand, wish to make up your own list.
3. Write the attitude-object word or phrase at the top of the page and place the adjectives beneath it. If you are examining more than one attitude object, use the same adjective order for each attitude object, and keep the words in the same position. Provide "random polarity." This means that the adjective pairs should *not* be listed so that all positive responses fall on one side and all negative responses on the other.

Example

How do you feel about each of these subjects? Place an X on one of the seven lines between each pair.

Physical education

bad							good
friendly							unfriendly
fair							unfair
sour							sweet

Art

bad							good
friendly							unfriendly
fair							unfair
sour							sweet

4. Instruct the respondents about how and where to mark their ratings. They should be instructed to respond quickly and on the basis of their first impressions. You may find that some people are not comfortable responding to a concept (e.g., physical education, art) with seemingly inappropriate adjectives (e.g., sweet-sour). You will have to reassure such people that this type of scale calls for *impressions*, not studied responses. If you are using the instrument with children, you would do well to give them some practice with other concepts (attitude objects) before they make their ratings on the concepts you want to measure.
5. Compute a person's score by assigning a "1" to responses indicating the most negative response, a "7" to the most positive response, and scoring intermediate responses from "2" to "6" accordingly. A person's score for any one attitude object is the average of responses to the attitude pairs.

Here are more adjective pairs you might use for constructing semantic differential rating scales:

negative	positive	negative	positive
boring	interesting	unhealthy	healthy
uninformative	informative	dull	lively
confusing	clear	weak	strong
irrelevant	relevant	unfair	fair
superficial	profound	dirty	clean
biased	objective	worthless	valuable
purposeless	purposeful	useless	useful
closed	open	passive	active
tense	relaxed	static	dynamic
unhappy	happy	unfriendly	friendly
angry	calm	wrong	right
cold	warm		